

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS:

1. (Currently Amended) A hydraulic pressure control device, comprising:
 - a cylindrical valve body;
 - a line port provided in the valve body and adapted to be supplied with a hydraulic fluid;
 - a supply port provided in the valve body and ~~supplying~~ to receive the hydraulic fluid supplied to the line port;
 - a spool valve disposed in the valve body and slidable along an inner surface of the valve body along an axis;
 - a linear solenoid valve which regulates hydraulic fluid pressure in a first conduit, the hydraulic pressure in the first conduit ~~provides~~ providing force against the spool valve in a first direction along the axis;
 - a feedback conduit fluidly ~~connects~~ connected to the supply port, hydraulic pressure in the feedback conduit ~~provides~~ providing a force against the spool valve in a second direction that is opposite to the first direction;
 - the hydraulic pressure in the first conduit and the hydraulic pressure in the feedback conduit together ~~contribute~~ contributing to an overall force on the spool valve that controls the physical relationship between the spool valve and the valve body;

at least one land portion provided at the spool valve and slidable along the inner surface of the valve body;

at least one recess provided at an edge of the land portion of the spool valve;
and

wherein a cross-sectional opening area being-open that opens to the inlet port between the at least one recess and the inner surface of the valve body continuously changes in a sliding direction of the spool valve, and

the cross-sectional opening area ~~of the recess~~ is formed to have a proportional relationship between flow quantity of a hydraulic fluid and moving distance of the spool valve;

the at least one recess having a bottom that is curved so that a depth of the at least one recess increases toward the edge of the land in a longitudinal direction of the spool valve; and

the at least one recess having a width at an outer surface of the spool valve that increases along a curved profile toward the edge of the land in the longitudinal direction of the spool valve.

2. (Currently Amended) A hydraulic pressure control device according to claim 1,

wherein the cross-sectional opening area between the at least one recess and the inner surface of the valve body is continuously decreased in sliding direction of the spool valve from the edge portion of the land portion.

3. (Canceled)

4. (Currently Amended) A hydraulic pressure control device according to claim 1, wherein the at least one land comprises a plurality of lands, each land being provided with a plurality of recesses ~~are provided at each land portion corresponding to the opening portion of the valve body.~~

5. (Currently Amended) A hydraulic pressure control device according to claim 1, wherein the at least one recess is formed by machining of the land portion using a T-slot cutter, and working edge of the T-slot cutter is shaped in accordance with shape of the at least one recess.

6. (Currently Amended) A hydraulic pressure control device, comprising:

- a cylindrical valve body;
- a line port provided on the valve body and adapted to be supplied with a line pressure;
- a supply port provided on the valve body and outputting a controlled pressure which is controlled from the line pressure;
- a spool valve disposed in the valve body and slidable along an inner surface of the valve body along an axis;
- a linear solenoid valve which regulates hydraulic fluid pressure in a first conduit, the hydraulic pressure in the first conduit ~~provides~~ providing force against the spool valve in a first direction along the axis;
- a feedback conduit fluidly ~~connects~~ connected to the supply port, the hydraulic pressure in the feedback conduit ~~acts~~ acting on the spool valve and

~~provides~~ providing a force against the spool valve in a second direction that is opposite to the first direction;

the hydraulic pressure in the first conduit and the hydraulic pressure in the feedback conduit together ~~contribute~~ contributing to an overall force on the spool valve that controls the physical relationship between the spool valve and the valve body;

at least one land portion provided at the spool valve and slidable along the inner surface of the valve body;

at least one recess provided at a wall of the inner surface of the valve body facing the outer surface of the spool valve;

wherein ~~the~~ a cross-sectional opening area ~~being open~~ that opens to the inlet port between the at least one recess and the outer surface of the spool valve is continuously decreased in a sliding direction of the spool valve from the opening portion and,

the cross-sectional opening area ~~of the recess~~ is formed to have a proportional relationship between flow quantity of a hydraulic fluid and moving distance of the spool valve;

the at least one recess having a bottom that is curved so that a depth of the at least one recess increases in a longitudinal direction of the valve body; and

the at least one recess having a width at an inner surface of the valve body that increases along a curved profile in the longitudinal direction of the valve body.

7. (Currently Amended) A hydraulic pressure control device, comprising:
a friction engagement means including a drive rotor and a driven rotor;

a piston ~~pushing~~ adapted to push a plurality of clutch discs between the drive rotor and driven rotor ~~and engaging to engage~~ the drive rotor with the driven rotor;

a hydraulic pressure chamber defined by the ~~hydraulic pressure for~~
~~changing a pushing force of the piston~~;

a hydraulic pressure control mechanism controlling hydraulic pressure to be supplied to the hydraulic pressure chamber;

a cylindrical valve body provided at the hydraulic pressure control mechanism;

a spool valve disposed in the valve body and slidable along an inner surface of the valve body;

a linear solenoid valve which regulates hydraulic fluid pressure in a first conduit, the hydraulic pressure in the first conduit ~~provides~~ providing force against the spool valve in a first direction along an axis;

a feedback conduit fluidly ~~connects~~ connected to the supply port, the hydraulic pressure in the feedback conduit ~~provides~~ providing a force against the spool valve in a second direction that is opposite to the first direction;

the hydraulic pressure in the first conduit and the hydraulic pressure in the feedback conduit together ~~contribute~~ contributing to an overall force on the spool valve that controls the physical relationship between the spool valve and the valve body;

at least one land portion provided at the spool valve and slidable along the inner surface of the valve body;

and at least one recess provided at an edge of the land portion of the spool valve;

~~a liner solenoid valve regulating a hydraulic pressure in the first conduit;~~

wherein the a cross-sectional opening area between the at least one recess and the inner surface of the valve body is continuously decreased in a sliding direction of the spool valve from the edge portion of the land portion;

the at least one recess having a bottom that is curved so that a depth of the at least one recess increases toward the edge of the land in a longitudinal direction of the spool valve; and

the at least one recess having a width at an outer surface of the spool valve that increases along a curved profile toward the edge of the land in the longitudinal direction of the spool valve.

8. (Currently Amended) A hydraulic pressure control device, comprising:
- a friction engagement means including a drive rotor and a driven rotor;
 - a piston ~~pushing~~ adapted to push a plurality of clutch discs between the drive rotor and driven rotor ~~and engaging to engage~~ the drive rotor with the driven rotor;
 - a hydraulic pressure chamber defined by the ~~hydraulic pressure for changing a pushing force of the piston;~~
 - a hydraulic pressure control mechanism controlling hydraulic pressure to be supplied to the hydraulic pressure chamber;
 - a cylindrical valve body provided at the hydraulic pressure control mechanism;
 - a line port provided in the valve body and supplied with a hydraulic fluid;
 - a supply port provided in the valve body and supplying the hydraulic fluid;

a spool valve disposed in the valve body and slidable along an inner surface of the valve body along an axis;

a linear solenoid valve which regulates hydraulic fluid pressure in a first conduit, the hydraulic pressure in the first conduit ~~provides~~ providing force against the spool valve in a first direction along the axis;

a feedback conduit fluidly ~~connects~~ connected to the supply port, the hydraulic pressure in the feedback conduit ~~acts~~ acting on the spool valve and ~~provides~~ providing a force against the spool valve in a second direction that is opposite to the first direction;

the hydraulic pressure in the first conduit and the hydraulic pressure in the feedback conduit together ~~contribute~~ contributing to an overall force on the spool valve that controls the physical relationship between the spool valve and the valve body;

at least one land portion provided at the spool valve and slidable along the inner surface of the valve body;

and at least one recess provided at a wall of the inner surface of the valve body facing the outer surface of the spool valve;

~~a linear solenoid valve regulating a hydraulic pressure which controls physical relationship between the spool valve and the valve body;~~

wherein the a cross-sectional opening area between the at least one recess and the outer surface of the spool valve is continuously decreased in a sliding direction of the spool valve; ~~from the opening portion~~

the at least one recess having a bottom that is curved so that a depth of the at least one recess increases in a longitudinal direction of the valve body; and

the at least one recess having a width at an inner surface of the valve body that increases along a curved profile in the longitudinal direction of the valve body.

9. (New) A hydraulic pressure control device according to claim 1, wherein the at least one recess also includes side walls extending from the bottom of the at least one recess to the outer surface of the spool valve, the side walls curving outwardly away from one another towards the outer surface of the spool valve.

10. (New) A hydraulic pressure control device according to claim 6, wherein the at least one recess also includes side walls extending away from the bottom of the at least one recess, the side walls being curved.

11. (New) A hydraulic pressure control device according to claim 7, wherein the at least one recess also includes side walls extending from the bottom of the at least one recess to the outer surface of the spool valve, the side walls curving outwardly away from one another towards the outer surface of the spool valve.

12. (New) A hydraulic pressure control device according to claim 8, wherein the at least one recess also includes side walls extending away from the bottom of the at least one recess, the side walls being curved.